

Antibody and T cell responses induced in chickens immunized with avian influenza virus N1 and NP DNA vaccine with chicken IL-15 and IL-18.

ABSTRACT

We had examined the immunogenicity of a series of plasmid DNAs which include neuraminidase (NA) and nucleoprotein (NP) genes from avian influenza virus (AIV). The interleukin-15 (IL-15) and interleukin-18 (IL-18) as genetic adjuvants were used for immunization in combination with the N1 and NP AIV genes. In the first trial, 8 groups of chickens were established with 10 specific-pathogen-free (SPF) chickens per group while, in the second trial 7 SPF chickens per group were used. The overall N1 enzyme-linked immunosorbent assay (ELISA) titer in chickens immunized with the pDis/N1+pDis/IL-15 was higher compared to the chickens immunized with the pDis/N1 and this suggesting that chicken IL-15 could play a role in enhancing the humoral immune response. Besides that, the chickens that were immunized at 14-day-old (Trial 2) showed a higher N1 antibody titer compared to the chickens that were immunized at 1-day-old (Trial 1). Despite the delayed in NP antibody responses, the chickens co-administrated with IL-15 were able to induce earlier and higher antibody response compared to the pDis/NP and pDis/NP+pDis/IL-18 inoculated groups. The pDis/N1+pDis/IL-15 inoculated chickens also induced higher CD8⁺ T cells increase than the pDis/N1 group in both trials ($P < 0.05$). The flow cytometry results from both trials demonstrated that the pDis/N1+pDis/IL-18 groups were able to induce CD4⁺ T cells higher than the pDis/N1 group ($P < 0.05$). Meanwhile, pDis/N1+pDis/IL-18 group was able to induce CD8⁺ T cells higher than the pDis/N1 group ($P < 0.05$) in Trial 2 only. In the present study, pDis/NP was not significant ($P > 0.05$) in inducing CD4⁺ and CD8⁺ T cells when co-administered with the pDis/IL-18 in both trials in comparison to the pDis/NP. Our data suggest that the pDis/N1+pDis/IL-15 combination has the potential to be used as a DNA vaccine against AIV in chickens.

Keyword: Avian influenza virus; CD4⁺ T cells; CD8⁺ T cells; DNA vaccine; IL-15; IL-18; N1; NP.